REMARKS

This communication accompanies an RCE and is responsive to the Final Office Action of August 11, 2008 and the Advisory Action of October 24, 2008.

By the present amendment, claims 1 and 11 are currently being amended, and no claims are canceled or added. Claims 1, 2, 4-17, and 19-21 remain pending in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier. Support for the claim amendments may be found throughout the specification as originally filed including, but not limited to, the specification as originally filed on page 12, lines 7-12.

Applicants respectfully request reconsideration of the present application in view of the reasons that follow.

Claims 1, 2, 4-17 and 19-21 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over Clawson *et al*, (U.S. 6,083,425) in view of Hwang *et al.* (U.S. 6,436,363). Applicants respectfully traverse this rejection.

Claim 1 currently recites, in part:

> A fuel processor for generating a H_2 rich gas from a fuel, comprising...an outer reforming zone...wherein the outer reforming zone...comprises a partial oxidation catalyst and a steam reforming catalyst or a combined partial oxidation and steam reforming catalyst; and *wherein the fuel processor is configured to conduct simultaneously a partial oxidation reaction and a steam reforming reaction in the outer reforming zone.*

Emphasis added. Likewise, claim 11 currently recites similar elements with respect to the inner reforming zone. It is evident from the specification, that the claimed fuel processors are intended to conduct both partial oxidation and steam reforming simultaneously within the same zone:

> The invented process and fuel processor designs overcome the high temperature problem of partial oxidation reactors, yet have excellent transient response capability, a significant problem associated with steam reforming. The fuel processor does this by providing at least one chamber in which partial oxidation and steam reforming are conducted simultaneously and by being designed such that heat generated from partial oxidation is used in the steam reforming reaction.

See original specification, page 12, lines 7-12. In accordance with the description, the presently claimed invention provides at least one chamber (i.e. the inner reforming zone and/or the outer reforming zone), where catalysts for both reactions reside, and, in which, both reactions are performed.

As pointed out in the background, fuel cells were known where the steam reforming and partial oxidation chambers were separated, however there are problems with separation of the zone such as the high temperatures (>1000°C) associated with partial oxidation catalysts. *See* specification, page 3, line 1-page 5, line 9 and also page 12, lines 2-6.

As Applicants have previously described, the cited Clawson reference does not describe a fuel processor both partial oxidation and steam reforming catalysts in the same zone, and thus Clawson cannot be found to teach a fuel processor where both partial oxidation and steam reforming occur in the same zone. In fact, Clawson explicitly requires that the partial oxidation and reforming zones be separate and distinct. Clawson states that "[t]hat the reformer includes a first vessel having a partial oxidation reaction zone and a *separate* steam reforming reaction zone that is *distinct* from the partial oxidation reaction zone." *See* U.S. 6,083,425 at col. 1, lines 63-66. As such, Clawson explicitly teaches away from partial oxidation and steam reforming catalysts in the same zone, and therefore Clawson cannot teach that steam reforming and partial oxidation occur simultaneously within the same zone. As the Supreme Court commented in *KSR Int'l Co. v. Teleflex Inc.*, "[w]hen the prior art teaches away from combining certain known elements, discovery of successful means of combining them is more likely to be non-obvious."

127 S.Ct. 1727, 1740, 82 USPQ2d 1385, 1395 (2007), *citing United States v. Adams* 383 U.S. 39, 40, 148 USPQ 479 (1966).

Clawson teaches a number of catalysts for the steam reforming zone and a number of catalysts for the partial oxidation zones. *See* col. 3, line 61- col. 4, line 10 and col. 5, lines 26-33. Yet, Clawson is explicit that the zones in which these operate are separate and distinct, as shown above. The Examiner appears to allege that because platinum and palladium appear in both lists that one can act as the other within a given zone. For example, the Examiner appears to allege that where platinum is present in a steam reforming zone it can act as a partial oxidation catalyst and *vice versa.*

In contrast, Applicants submit that more than just the identity of the catalyst is at work in these systems. There are considerations given to temperatures in the zones, flow rates, etc. In fact, Clawson describes both high temperature and low temperature shift zones and the catalysts that are used in each or not wholly the same. *See Id.* at col. 4, line 43 – col. 5, line 40. Further, Clawson's list of steam reforming catalysts is not the wholly the same as the shift zone catalysts. *See Id.* at col. 3, lines 63-67 and col. 4, line 43 – col. 5, line 40. With regard to temperatures, Clawson states that the steam reforming zone has a temperature of 700 to 900°C and the partial oxidation zone has a temperature from about 950 to 1150°C. *See Id.* at col. 6, lines 3 and 14. Thus, these two zones operate at different temperatures thereby resulting in different effects according to Clawson. Applicants submit that, based upon Clawson, there is no reason given to one of skill in the art to use the catalysts of one zone in another. Further, there is no reason provided by Clawson that if the skilled artisan were to use a platinum or palladium catalyst in a partial oxidation zone at a high temperature, that it would, or even could, function as a steam reforming catalyst at that temperature, as is suggested by the Examiner.

The Examiner is reminded that the "[t]he mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency...That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is unknown...." *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993), citations omitted. Here

the explicit teaching away from the combination of a steam reforming catalyst and a partial oxidation catalyst in the same zone, and the different temperatures in those zones, do not provide reasons to one of skill in the art to make the Examiner's proposed modification of Clawson. In view of Clawson, Applicants submit that to the skilled artisan, the combination of a partial oxidation catalyst and a steam reforming catalyst in the same zone remains unknown and cannot form the basis for a *prima facie* case of obviousness.

Applicants have shown above that Clawson fails to teach or suggest the combination of a partial oxidation catalyst and a steam reforming catalyst in the same zone, and, in fact, Clawson explicitly teaches away from such a combination. As such, Hwang must then be relied upon for such a teaching. However, if the proposed combination were so made, then Hwang would render Clawson unsuitable for its intended purpose, contrary to the teaching of MPEP 2143.01 (V) ("The proposed modification cannot render the prior art unsatisfactory for its intended purpose").

Hwang is directed to a monolithic substrate with a channel that allows for a hydrocarbon, water, air mixture stream to flow. *See* U.S. 6,436,363 at col. 7, lines 5-19. Hwang discloses layered partial oxidation and steam reforming catalysts on the substrate, where one layer is on top of another layer, or they may be zoned. *See Id.* at col. 3, lines 48-60. However, there is no suggestion that they may be combined, and even if they were combined, there is no suggestion to use such materials in the fuel processor of Clawson.

In the Final Office Action of August 11, 2008, the Examiner references the previous Non-final Office Action of April 9, 2008, for the rejection based upon Hwang. Page 2, lines 9-10. In the Non-final Office Action, the Examiner stated that "it would have been obvious from such a disclosure of Hwang et al to employ a catalyst comprising platinum on gadolinium doped ceria as the catalyst in the inner zone of Clawson. Page 4. However, the explicit requirement in Clawson of the separate and distinct reforming zone and partial oxidation zone defeats any suggestion of using one with the other, contrary to the Examiner's suggestion. Clawson has provided separate and distinct regions and the Examiner's suggestion to subvert this requirement by combining with Hwang, could render Clawson unsatisfactory for its intended purposes contrary to the MPEP

2143.01 (V) (The proposed modification cannot render the prior art unsatisfactory for its intended purpose).

Applicant submits that by Clawson requiring separate and distinct partial oxidation and steam reforming zones, Clawson cannot be found to provide any teaching, suggestion, or reason to the skilled artisan to use both partial oxidation and steam reforming catalysts in the same chamber where partial oxidation and steam reforming reactions occur simultaneously. Applicant respectfully requests that the present rejections based upon Clawson and Hwang be withdrawn and the application allowed to proceed to issuance.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

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By _____

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